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Domain Name System Implementation Schedule

Status of this Memo

This memo is a policy statement on the implementation of the Domain Style Naming System in the Internet. This memo is a partial update of RFC 881. This is an official policy statement of the ICCB and the DARPA.

The intent of this memo is to detail the schedule for the implementation for the Domain Style Naming System. The explanation of how this system works is to be found in the references.

The Current Situation

Simple Names

Hosts in the ARPA research and DDN operational communities are currently assigned names in a flat or global name space of character strings. There are some limits on these names. They must start with a letter, end with a letter or digit and have only letters or digits or hyphen as interior characters. Case is not significant.

For example: USC-ISIF

Tables

Every host in the Internet is expected to have a way of translating the name of any other host into its Internet address.

By and large, the name to address translation is done by looking up the information in a table of all hosts.

The maintenance of this table is centralized at the Network Information Center (NIC). Each host is expected to obtain a current copy of the table on a timely basis.

Interface to the World

A great deal of mail moves between the Internet and other "systems" that somehow transport mail among computers. This is currently done by hiding some sort of "other-system" addressing information in the local-part of the mail address and using a mail-relay host in the host-part of the mailbox.

For example,

OBERST%EDUCOM.MAILNET@MIT-MULTICS
EDMISTON.CIC@CSNET-RELAY

The Future Situation

Hierarchical Names

Because of the growth of the Internet, structured names (or domain style names) will be used. Each element of the structured name will be a character string (with the same constraints that previously applied to the simple names).

For example: F.ISI.USC.ARPA

Servers

Every host in the Internet will be expected to have a way of translating the name of any other host into its Internet address.

By and large, the name to address translation will be done by interacting with a service. There will be a number of servers that each hold a portion of the name to address information.

The maintenance of the translation data will be subdivided and distributed.

There are several stages of implementation for the servers and several levels of development for use of the domain style names.

First, there is the simple substitution of the domain style names for the current host names, and the subdivision of these into several domains. At this stage all domain style names directly translate to host addresses and all domain style names have two components.

For example: USC-ISIF.ARPA or USC-ISIA.DDN

and: Postel@USC-ISIF.ARPA or Kahn@USC-ISIA.DDN

Here we expect that "USC-ISIF.ARPA" is the name of an Internet host and that we can send mail for "Postel" to the SMTP port on that host. It may be that some backward host can still fake it by ignoring the ".ARPA" and looking up an address for "USC-ISIF".

Using the domain name servers (but not the tables) mail forwarding may be supported. A domain name server query can say "I want to send mail to ABCDEF.ARPA". The response might be "to send mail to ABCDEF.ARPA send it to the mail relay GHIJKL.ARPA at address 123.123.123.123".

Second, there is an extension to more name components.

For example: F.ISI.USC.ARPA or A.USC-ISI.DDN

and: Postel@F.ISI.USC.ARPA or Kahn@A.USC-ISI.DDN

Here we expect that "F.ISI.USC.ARPA" is the name of an Internet host and that we can send mail for "Postel" to the SMTP port on that host. It is unlikely that a backward host can hack this at all.

Third, there is an extension to domain style names that may represent only organizations or administrative entities. Finding a host that represents such entities may require a level of indirection in the search.

For example: USC-ISI.ARPA or ARPA.DDN

and: Postel@USC-ISI.ARPA or Kahn@ARPA.DDN

Here we don't count on "USC-ISI.ARPA" being the name of an Internet host. When we want to send mail to "Postel" we ask the domain name server about sending mail to "USC-ISI.ARPA". The server will tell us the name (and address) of a real Internet host that handles mail on this organizations behalf, for example, "F.USC-ISI.ARPA = 10.2.0.52". We then send mail for "Postel" to the SMTP port on F.USC-ISI.ARPA.

Interface to the World

Mail will continue to move between the Internet and other "systems". This may be done by designating some sort of "other-system" representative organization in the domain server data bases that can indirect mail to a mail-relay host.

For example,

OBERST@EDUCOM.MAILNET
EDMISTON@CIC.CSNET

The Transition Situation

Actually, the situation is a bit more complicated, of course. A number of hosts are already using domain style names under the constraint that their domain style name is exactly their old style name with the string ".ARPA" appended. The first transition step is to have all hosts do this, and then to eliminate the user of old style names altogether.

Please note carefully that two types of changes are being made:

One is a change in the support mechanism for translating a host name to an internet address,

that is from using local copies of a full centrally maintained table to dynamically accessing a distributed set of servers each posesing a portion of a data base maintained in a distributed fashion.

The other is a change in the host names themselves,

from a flat global space of unstructured strings to a hierarchical structure of names.

There are four steps to the transition plan.

First, change from old names to domain style names.

host-name --> host-name.ARPA

Second, one domain to a few domains.

host-name.ARPA --> host-name.ARPA and host-name.DDN

Third, change from using central tables to using name servers.

Fourth, allow many domains.

There are two communities that are taking slightly different courses in this transition. The ARPA research community is making the full transition. The DDN operational community is making the change in naming on the same schedule, but is not requiring hosts in the DDN operational community make the change to using servers at the same time (they can if they want to). The DDN PMO will establish a schedule for that change at a later time. The NIC will maintain a central table of all DDN operational hosts.

Interface to the World

The interchange of mail with "other-systems" will have to continue pretty much as it does now (except that RELAY-HOST will become RELAY-HOST.ARPA) until organization names can be used. Then representative organizations can be designated for each "other-system" in the domain server data bases that will then indirectly specify a mail-relay host.

Policy Statement

The names of hosts will be changed to domain style names. Hosts will begin to use domain style names on 14-Mar-84 and the use of old style names will be completely phased out before 2-May-84.

This applies to both the ARPA research hosts and the DDN operational hosts.

Implication

All Hosts Change Names

The impact of introducing the domain style names is that all hosts change their names at least once. Hosts that move to new domains or subdomains may change their names several times.

Hosts have an official (or primary) name and possibly several nicknames. When mail is sent from a host, the official name is used in the mail header address fields.

Suppose, that in the old days before domains were thought of, a host changed its name. What is the impact on users of changing the name of a host? Suppose one host changed its name from FOO to BAR.

Mail

Mail that was sent before the name was changed can not be answered using mail program commands that automatically fill in the return address. While it may be possible to use special tricks to fix up the "From" or the "To" users addresses, the "Cc" addresses are very difficult to correct.

Mail that was sent to JOE@ABC from FRED@FOO can not be answered unless the change of name is known to the user or the mail program an ABC and the host name BAR substituted for FOO.

Mail that is sent to JOE@ABC from SAM@DEF with a cc to FRED@FOO can not be answered easily.

Mailing Lists

Any mailing lists that have mailboxes on the host that changed names will now have incorrect entries.

The point is that while the host that changed names may be able to use special tricks for a while to fix things up for the users, it is difficult for other hosts to do this.

A general trick is to make the old name a nickname for the host for some period of time.

The introduction of domain style names means that all hosts change their names essentially at the same time.

For example, USC-ISIF changes to USC-ISIF.ARPA

To lessen the resulting havoc, the initial set of new names has a fixed relationship to the old names. The first set of domain style names is exactly the old names with the domain name "ARPA" appended. That is, if a hosts old name was "HOST-NAME", then its new name is "HOST-NAME.ARPA".

To further lessen the havoc, there will be a period of time when both the old and the new names are allowed. That is, the old names will be nicknames for a while.

Primary Names

In to old style names, host have an official or primary names and may have several nicknames. For example,

Primary Name	Nicknames
USC-ISIF	ISIF
ADA-VAX	ISI-VAXB AJPO VAXB

In any case, the data base in such than given any of the names for a host one can find the address, and given the address one can find the primary name.

In the new domain style name system this property must be maintained. That is, given the Internet address of a host one

must be able to find the primary name of that host. This calls for careful management of the distributed database by those in charge of the domains and subdomains.

The Time Table

-- Nov 83 Plan and Schedule

At this point the overall plan for the implementation of domain style names and name servers, and a schedule of events was published (RFC-881). Also the draft design and specification for the protocol and data base were published (RFC-882, RFC-883).

-- Nov 83 Initial Domain Style Host Name Table

At this point a version of the host table which includes the domain style names is made available (DHOSTS.TXT).

-- Feb 84 Domain Requirements Specification

At this point the requirements for establishing a new domain are published as an RFC.

14 Mar 84 Begin using Domain Style Names

At this point all hosts should start using their domain style names as their official and primary names. The standard table of host names contains domain style names as the official and primary name (DHOSTS.TXT becomes HOSTS.TXT).

04 Apr 84 Server for ARPA Domain

At this point several domain name servers are in operation to supply host name to internet address translations, one of these servers is at the NIC.

04 Apr 84 Domain Table

At this point a master table of top level domain names and their associated servers is established at the NIC.

02 May 84 Stop using old style Names

At this point the use of old style names must be completely phased out.

02 May 84 Certain New Domains

At this point a few new domains may be established, in particular the DDN domain.

06 Jun 84 General & Multilevel Domains

At this point additional new domains may be established, if they meet the requirements. Domain style names may have more than two segments.

18 Jul 84 Organizational Domains

Domain style names may identify organizations. Finding an address for a host may involve a level of indirection.

05 Sep 84 Decommission Host Table

At this point the master host table maintained by the NIC need no longer be complete for the ARPA research community. A full table of the DDN operational hosts will be maintained by the NIC.

03 Oct 84 DDN Plan for Domains Name Service

At this point the DDN PMO will establish a plan for the future support of name to address translations in the DDN community.

References

[1] Postel, J., "The Domain Names Plan and Schedule", RFC-881, USC Information Sciences Institute, November 1983.

[2] Mockapetris, P., "Domain Names - Concepts and Facilities", RFC-882, USC Information Sciences Institute, November 1983.

[3] Mockapetris, P., "Domain Names - Implementation and Specification", RFC-883, USC Information Sciences Institute, November 1983.